

KIT ENTERPRISES, INC.
OPERATION INSTRUCTIONS
for
WASTE WATER AND PRETREATMENT SYSTEM

by

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Project No. 78326
Revised October 9, 1978



PURPOSE

The following report is to describe the operation of the Kit Enterprises Waste Water and Pretreatment Facilities located on Division Street in Elizabeth, New Jersey. The system has been designed to remove and separate floatables and solids from the raw waste received for recovery and to produce an effluent which will meet the requirements as set forth by the City of Elizabeth and the Joint Meeting Authority Regulations. The plant shall also meet the mandate described by Federal Law, Chapter 92-500.

Specifically, the discharge to the sanitary sewer system of the City of Elizabeth shall meet the following Regulations:

1. No temperatures higher than 150° F. without approval.
2. No grease or oil or other substances that can solidify or become discernibly viscous at temperatures under 150° F.
3. No mineral oil or grease in concentrations exceeding an average of 100 mg/l.
4. No flammable or explosive liquids, solids or gas.
5. No noxious gases (H_2S , SO_2 , N_xO) in excess of 2 mg/l.
6. No solids or viscous material capable of obstructing the flow in sewer or interfering with operation of, or causing treatment difficulties or an unsatisfactory plant effluent.
7. pH range between 5.0 and 9.0.

8. No toxic or poisonous substances in amounts exceeding those defined by EPA regulations, or that create any hazard.
9. No heavy metals in excess for the following:
Iron (Fe), 5 mg/l; Chromide (Cr), 1 mg/l; Nickel (Ni), 1 mg/l; Copper (Cu), 1.0 mg/l; Cadmium (Cd), 0.1 mg/l; Zinc (Zn), 3 mg/l. Hourly concentrations should not exceed 3 times the average.
10. No cyanide (CN) amenable to chlorination in excess of 0.08 mg/l. Peak daily concentrations should not exceed 0.2 mg/l. Total cyanide is not to exceed 0.5 mg/l at any time.
11. No strong acid or pickling wastes or concentrated plating solutions.
12. No noxious or malodorous gas or substance creating a public nuisance, hazard or menace.
13. No radio-active wastes or isotopes exceeding limits established by Federal Regulations.
14. No slug discharges having concentrations greater than 5 times the normal for periods of 15 minutes.
15. No concentrated dye wastes or spent tanning solutions of unusual volume or concentration.
16. No wastes which may, upon interaction with other sewage constituents, release noxious gases that develop undesirable color or form objectionable concentrations of suspended solids..
17. No excessive short duration peak flow rates which can upset the treatment process or efficiency, or exceed the capacity of the sewer system.

DESCRIPTION OF OPERATION

The influent to the waste water treatment facilities will be received at the pumping station, shown on the drawing of the tank farm. The tank trucks delivering the wastes will be owned and operated by outside contractors and will be approved by the Department of Transportation. Each load shall have a separate manifest. A physical sample will be obtained from the truck and spot checked making sure that it conforms with the manifest and that it can be adequately treated at the plant to meet the requirements as set forth by the City of Elizabeth.

The unloading area will drain to the sump so that any drippings and spillage will be directed into the process and will not contaminate the environment. The loading zone is equipped with three (3) 10-horse power motors and industrial rated pumps that can pump at a rate of 1,000 gallons per minute to a 3-inch line which will discharge to eight (8) 18,000 gallon tanks with submerged type filling. A total of 14 tanks exist in the tank farm. Three (3) tanks will be reserved for emergency conditions and three (3) tanks will be utilized for the storage of recovered material.

Samples of the waste will be tested to ascertain whether or not pH adjustment is required, as well as the amount and type of coagulants and coagulant aids required to produce a proper effluent. Tests will also be performed to see if it might be advantageous to blend certain wastes together prior to treatment. Tests shall be performed to ascertain the required settling time to remove any materials such as heavy metals which might be precipitated out upon adjustment of the pH. The clear liquid will then be pumped from the 18,000 gallon receiving tanks to Sludge Box #16 in the Drum House, now called the Control Processing House, by 1 1/2 H.P. 250 GPM industrial pumps which are available to make the transfer. The rate of pumping will be such as to provide the required settling detention period in the settling tank. Equipment is being provided within the Control Processing House to provide the following:

1. Acid for pH adjustment
2. Ferric sulfate solution
3. Liquid alum
4. Hydrate of lime
5. Magnifloc polymers
6. Oxygen

The pH will be adjusted automatically and the chemicals required for the specific waste to achieve proper sedimentation will be added. Any solids which may form within the Sludge Box #16 will be removed by a 3-inch air-operated diaphragm pump and held in the 3,000 gallon storage tank for disposal at a later date. The effluent from Sludge Box #16 will travel underground to the Central Process sump where two (2) float operated sump pumps are available to discharge the waste to the clarifier. Each pump is capable of performing the entire work, the other pump remains as a stand-by pump.

The Clarifier tank will provide the means for the separation of any floatables and the removal of settleable solids. The surface of the tank is provided with a skimming mechanism; the bottom of the tank is provided with a sweep type collecting mechanism with a center bottom outlet. The floatables, as well as the sludge, will be continuously removed and collected for disposal. After approximately 5,000 gallons of the sludge has been accumulated, it will be tested and a proper manifest prepared and the sludge will be removed by a private contractor to an approved incinerator or disposal site.

The process of sludge removal is controlled by the raising or lowering of the Telescopic Valve. The floatable material,

which will be collected by the Clarifier Surface Skimmer and retained by the inner weir, will be collected and combined with the sludge for disposal.

The resulting clarified water passes under the inner weir and over the outer saw tooth weir to the Circular Clarifier Collection Basin and flows to the Neutralization Tank. The Neutralization Tank is provided to control the pH of the effluent prior to the discharge into the sewer of the City of Elizabeth. This is to insure that the pH, as it leaves the treatment process, will meet the requirements as set forth by the City of Elizabeth.

In the Neutralization Tank, the primary pH sensor (Red Pen) is a Leeds and Northrup 7773 Unit. The unit determines and records on the Speedomax-M Receiver that which is transmitted from Measuring Electrodes of the 7773 Unit to the 7073 Monitor Unit which transmits a signal to the receiver unit or pH Meters. This controls the pH within .02% accuracy. The initial pH of the entering clarified water is then totally recorded to better control the discharge.

If the pH is high, the 7773 Measuring Electrodes transmits its signals to the 7070 Recorder or Speedomax-M, which in turn transmits the signal to the sensor or controller to open the

Acid Valve on the feed line from the Acid Storage Tank (3,000 gallons in size as shown in drawing). This allows concentrated sulfuric acid to enter the water in the Neutralization Tank.

If the pH is lower, the 7773 Measuring Electrode transmits its signal to the 7070 Recorder or Speedomax-M which transmits its signal to the sensor or Controller to open the Caustic Valve on the feedline from the Caustic Storage Tank (3,000 gallons in size). This allows the concentrated caustic to enter the water in the Neutralization Tank. A continuous running agitator in the tank mixes the clarified water and acid or caustic together so that the pH will be lowered or raised to the desired level. As the level of water in the Neutralization Tank rises, it will begin to overflow into the Discharge Well.

At the Discharge Well, the secondary pH Control Unit (Blue Pen) 7773 Measuring Electrode transmits it signals to the secondary 7070 Recorder or Speedomax-M. This 7070 Recorder or Speedomax-M transmits the signal to the 7073 Receiver Unit which records the discharge pH from the Discharge Well, giving the level of the final discharge pH.

At this point, the total flow of waste water that has entered the Neutralization Chamber has been recorded. The pH entering the Neutralization Chamber and the adjusted pH for discharge also has

been recorded, as well as the final pH for discharge from the Discharge Well. This results in a total control of the waste water at the pH level desired as it leaves the Pretreatment System. A Flow Meter will be provided to indicate, totalize and record the total flow being discharged. A sampler will be provided to continuously sample the quality of the effluent being discharged. The quality will be tested frequently throughout the day to insure that the requirements promulgated by the City of Elizabeth will be met.

From the Discharge Well, the water flows to Manhole #1 and then to the Main City Sewer Lines. The material collected in the Sludge Holding Tank, drawn from the bottom of the Holding Tank in the tank farm, and from the Sludge Box #16, will be periodically removed from the plant. A waste sludge disposal company will bring its truck to the sludge tank and pump out the collected sludge and floatable materials. The recovered materials can then be delivered to a licensed land fill or to a licensed incineration unit for disposal.

The Pretreatment Plant Control House contains the final pH controller and recorder indicators in a panel box. The Air Compressor and Diaphragm pump along with the main electrical power supply and distribution can also be found in the drawing of Anderson and Ballis, #71011-5 of 5.

The Pretreatment Plant's Acid Storage Tank is lined with marble chips at the bottom of the dike. There are two (2) valves on the fill line for the tank. These extend to the road. The tank has a vent with a moisture dessicator and liquid level sight glass. There are two (2) manually operated shut off valves on the Discharge Line from the tank.

CENTRAL PROCESS SUMP

1. The Float Operated Sump pumps are to be adjusted so that they operate every 15 minutes. This is done by setting the adjustable trip nut on the Float Stem (drawing A.M. Kinney, Inc., 472-2 #307, Section F-F).
2. Since there are two (2) sump pumps, these should be rotated every two months, one in operation and one on stand-by. This will allow each pump to receive periodical maintenance and insure that both pumps are operational.
3. If both pumps become inoperative, the waste effluent will overflow from the sump and activate the high level alarm through a check valve to Collection Basin #11 of the Storm Drain System (drawing #I.P.I. 317 and A.M. Kinney, Inc. #304). If both pumps continue to be inoperative, the treatment process will be discontinued until repairs are made.

CLARIFIER TANK

1. The main collector drive should have periodical maintenance to insure continued operation (found in drawing by Anderson and Ballis #71011-3 of 5).
2. The gasket material on the surface skimmer should be periodically checked for deterioration and replaced when required.
3. The gasket and sealant around the outer saw tooth weir must be periodically checked for leaks. If leaks are noted, they should be repaired immediately.
4. The circular Clarifier Collection Basin must be kept free of debris so that there is no obstruction to the flow of Clarified waste water to the Neutralization Tank.

WINTER USE

There is a steam line located in the East Wall of the Clarifier next to the cooling tower. This steam line is to be used during the winter months to prevent ice formations on the Clarifier's drive mechanism, found in drawing of Anderson and Ballis #71011-1 of 5).

